

REMARKS

Favorable reconsideration is respectfully requested.

The claims are 1-26.

The indication that claims 3-5, 10-12 and 19-26 would be allowable if rewritten in independent form is acknowledged with appreciation. However, for reasons set forth below, it is considered that all of the claims in this application are now in condition for allowance.

Claims 1-2, 6, 8 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakayama (JP 59-109528).

Further, claims 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakayama.

These rejections are respectfully traversed.

A brief discussion of the present invention will be of assistance in appreciating Applicants' reasons for traversal of the rejection.

The surface-protected plastic composite material of the present invention comprises a transparent plastic substrate, a coating layer (I) and a thermally cured coating layer (II). The composite material of the present invention has a coating layer (I) as a first layer stacked up on the transparent plastic substrate and a thermally cured coating layer (II) as a second layer stacked up on the first layer.

In other words, the composite material of the present invention has a laminate structure comprising the second layer, the first layer and the transparent plastic substrate in the mentioned order.

The first layer and the second layer of the composite material of the present invention are formed of the following resin compositions, respectively.

(1) first layer (coating layer (I))

The first layer is formed of a resin composition containing at least 50 wt% based on the resin content thereof, of an acrylic resin which is an acrylic resin containing at least 50 mol% of a recurring unit of the formula (I-a).

(2) second layer (thermally cured coating layer (II))

The second layer is made of an organosiloxane resin formed from the following components a, b and c.

(A) colloidal silica (component a)

(B) a hydrolysis condensate (component b) of a trialkoxysilane of the formula (II-1), and

(C) a hydrolysis condensate (component c) of a tetraalkoxysilane of the formula (II-2), wherein the organosiloxane resin contains 5 to 45% by weight of the component a, 50 to 80 % by weight, as $R^2SiO_{3/2}$, of the component b and 2 to 30% by weight, as SiO_2 , of the component c.

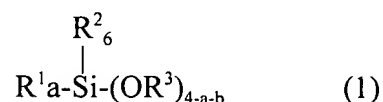
Since the composite material of the present invention has the first layer and the second layer stacked on the transparent plastic substrate, the surface-protected plastic composite material has excellent abrasion resistance and peel resistance.

It is considered that the above two excellent resistance properties of the present invention are obtained from the organosiloxane resin of the second layer in particular. That is, the resin of the second layer comprises colloidal silica (component a), a hydrolysis condensate (component b) of a trialkoxysilane and a hydrolysis condensate (component c) of a tetraalkoxysilane in a specific ratio. The above abrasion resistance, peel resistance and weatherability become excellent due to the organosiloxane resin having the above composition.

Turning to the cited reference Nakagawa et al. - JP 59-109528, hereinafter Nakagawa, it discloses that a base coat and a top coat are formed on a polycarbonate resin molding. The base coat (first layer) comprises a copolymer of alkoxysilyl acrylate, vinyl alkoxysilane and another monomer.

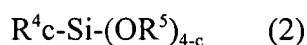
Nakagawa also teaches that the top coat (second layer) is made from a composition comprising the following components (A) to (D):

(A) a hydrolysis condensate of a silicon compound having an epoxy group represented by the following general formula (1):



wherein R^1 is an organic group having an epoxy group, R^2 is a hydrogen atom or hydrocarbon group having 1 to 6 carbon atoms, R^3 is a hydrocarbon group having 1 to 5 carbon atoms or an acyl group having 1 to 4 carbon atoms, a is an integer of 1 to 3 and b is an integer of 0 to 2, with the proviso that $(a + b)$ is 3 or less,

(B) a hydrolysis condensate of an organic silicon compound represented by the following general formula (2):



wherein R^4 is a hydrocarbon group having 1 to 6 carbon atoms or organic group having a methacryloxy group, amino group, mercapto group, fluorine or chlorine and having 1 to 6 carbon atoms, R^5 is a hydrocarbon group having 1 to 5 carbon atoms, alkoxyalkyl group having 1 to 5 carbon atoms or acyl group having 1 to 4 carbon atoms, and c is an integer of 0 to 3,

(C) colloidal silica, and

(D) a curing catalyst.

In short, the composition of the top coat of Nakagawa is a composition comprising (A) a hydrolysis condensate of an alkoxysilane having an epoxy group, (B) a hydrolysis condensate of an alkoxysilane other than (A), and (C) colloidal silica.

A detailed description will now be given of (A) and (B) of the top coat of Nakagawa because it is important for comparison between Nakagawa and the present invention.

The alkoxysilane having an epoxy group (A) of Nakagawa includes monoalkoxysilane, dialkoxysilane and trialkoxysilane but not tetraalkoxysilane as is obvious from the definition of the above general formula (1). This is also understood from examples of the silicon compound of the general formula (1) and the general formula (2) of Ref. (please refer to the attached partial English translation of a paragraph from page 3, lower right column, line 5 from the bottom to page 4, lower right column, line 3 from the bottom).

The organic silicon compound (B) of Nakagawa includes monoalkoxysilane, dialkoxysilane, trialkoxysilane and tetraalkoxysilane as obvious from the definition of the above general formula (2).

Nakagawa enumerates 17 compounds as examples of the organic silicon compound (B) as shown in the above partial English translation. The 17 compounds consist of 1 monoalkoxysilane, 3 dialkoxysilanes, 12 trialkoxysilanes and 1 tetraalkoxysilane.

When Applicants investigated the compositions of the top coats in all Examples and Comparative Examples of Nakagawa, (A) γ -glycidoxypropyltrimethoxysilane, (b) methyltrimethoxysilane and (C) colloidal silica are used in all Examples and Comparative Examples (Examples 1 to 6 and Comparative Examples 1 to 3).

Thus, Nakagawa discloses a composition comprising (A) trimethoxysilane having an epoxy group, (B) methyl trimethoxysilane and (C) colloidal silica as the top coat in all Examples and Comparative Examples. Nakagawa fails to disclose an example in which a tetraalkoxysilane is used in the top coat.

The rejection states at page 3, lines 2-7 of the Office Action that the top coat of Nakagawa comprises (A) trialkoxysilane, (B) tetraalkoxysilane and (C) colloidal silica.

The above statement of the rejection is based on a detailed analysis of the description of Nakagawa.

Since (A) of Nakagawa is a mono-, di- or tri-alkoxysilane, and (B) is a mono-, di-, tri- or tetra-alkoxysilane as described above, the composition forming the top coat of Nakagawa includes a composition comprising (A) a trialkoxysilane and (B) a tetraalkoxysilane. However, a large number of compounds as examples of (B) include only one tetraalkoxysilane and no tetraalkoxysilane is used in Examples and Comparative Examples.

In addition, Nakagawa fails to disclose or suggest an effect and advantage obtained by using a tetraalkoxysilane in the top coat.

It is obvious from Table 7 (pages 57 to 58) that the second layer of the present invention (corresponding to the top coat of Nakagawa) has excellent abrasion resistance and weatherability because it is formed from a composition which comprises colloidal silica, a trialkoxysilane and a tetraalkoxysilane.

In contrast to this, when no tetraalkoxysilane is used in the second layer (Comparative Example 1: as for the composition of the second layer of Comparative Example 1, refer to II-11 of Table 6), abrasion resistance and weatherability become lower as shown in Table 7 (page 59).

Thus, since the second layer of the present invention comprises colloidal silica, trialkoxysilane and tetraalkoxysilane in a specific ratio, it has excellent abrasion resistance and weatherability. This effect of the present invention is neither disclosed nor suggested by Nakagawa.

Consequently, since the invention set forth in claims 1-2, 6, 8 and 13-18 of the present application is not disclosed by Nakagawa, it is not anticipated by Nakagawa.

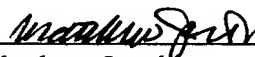
Furthermore, since the present invention provides properties unexpected from the teachings of Nakagawa, it is clear that the present claims are unobvious over Nakagawa.

No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact undersigned at the telephone number below.

Respectfully submitted,

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